

UNIVERSITY OF KANSAS PUBLICATIONS

MUSEUM OF NATURAL HISTORY

The University of Kansas Publications, Museum of Natural History, beginning with volume 1 in 1946, was discontinued with volume 20 in 1971. Shorter research papers formerly published in the above series are now published as Occasional Papers, Museum of Natural History. The Miscellaneous Publications, Museum of Natural History, began with number 1 in 1946. Longer research papers are published in that series. Monographs of the Museum of Natural History were initiated in 1970. All manuscripts are subject to critical review by intra- and extramural specialists; final acceptance is at the discretion of the publications committee.

Institutional libraries interested in exchanging publications may obtain the Occasional Papers and Miscellaneous Publications by addressing the Exchange Librarian, The University of Kansas Library, Lawrence, Kansas 66045. Individuals may purchase separate numbers of all series. Prices may be obtained upon request addressed to Publications Secretary, Museum of Natural History, The University of Kansas, Lawrence, Kansas 66045.

Editor: ED WILEY

Managing Editor: JOSEPH T. COLLINS

PRINTED BY
UNIVERSITY OF KANSAS PRINTING SERVICE
LAWRENCE, KANSAS

UN1
8128

MUS. COMP. ZOO.
LIBRARY

OCCASIONAL PAPERS

JAN 25 1981

of the
MUSEUM OF NATURAL HISTORY
The University of Kansas
Lawrence, Kansas

HARVARD
UNIVERSITY

NUMBER 88, PAGES 1-9

JANUARY 14, 1981

**THREE NEW SPECIES OF CENTROLENID FROGS
FROM THE PACIFIC VERSANT OF ECUADOR
AND COLOMBIA**

by
WILLIAM E. DUELLMAN¹

Field work on the forested Pacific slopes of Ecuador and Colombia in 1975 resulted in large collections of centrolenid frogs, including some unnamed species of *Centrolenella*. The perpetually humid forested slopes of the Andes between 1000 and 2000 m are inhabited by many species of *Centrolenella*. Some have elevational distributions of nearly 1000 m; others are restricted to narrow elevational zones. A few species have rather broad geographic distributions, whereas others are known from only one valley. A change of a few hundred meters in elevation or to a different drainage system results in a different centrolenid fauna. As many as five species of *Centrolenella* can be found along a single stream on one night.

Several taxonomic problems still exist with the centrolenid frogs on the Pacific versant of Ecuador and Colombia, but herein I am concerned only with three highly distinctive species in the *Centrolenella prosoblepon* group as defined by Starrett and Savage (1973). My own collections have been augmented by specimens obtained by subsequent collectors. In the following descriptions, the format for the diagnoses and descriptions is the same as that used by Lynch and Duellman (1973).

***Centrolenella balionota* new species**
(Fig. 1)

Holotype.—KU 164702, an adult male, from 3.5 km (by road)

¹ Curator, Division of Herpetology, Museum of Natural History, and Professor, Department of Systematics and Ecology, The University of Kansas, Lawrence, Kansas 66045.

northeast of Mindo, 1540 m, Provincia de Pichincha, Ecuador (00° 01'S, 78°44'W), one of a series collected on 7 April 1975 by William E. Duellman, Alan H. Savitzky, and John E. Simmons.

Paratopotypes.—KU 164701, 164703-13, 7-8 April 1975, same collectors.

Referred specimen.—KU 145084 from La Costa, 800 m, Departamento Cauca, Colombia.

Diagnosis.—1) prevomerine teeth absent; 2) bones pale green; 3) parietal peritoneum white; visceral peritoneum clear; 4) color in life pale green with reddish brown stripes and flecks and elevated yellow spots; in preservative, cream with reddish brown markings and white spots; 5) webbing between outer fingers III 2—2 IV; 6) webbing on foot I $1\frac{1}{2}$ —2 II $1\frac{1}{2}$ —1 III $1\frac{1}{2}$ —3 IV 3— $1\frac{1}{2}$ V; 7) snout truncate in dorsal and lateral profiles; 8) dorsal skin smooth; 9) arms and legs lacking dermal folds; 10) humeral spine present in males; 11) lower four-fifths of tympanum visible, directed posterolaterally with slight dorsal inclination.

Color pattern alone distinguishes *C. balionota* from all other known *Centrolenella*. In other species having yellow or gold spots, the spots are either small (*C. flavopunctata*, *midas*, *siren*), ocelli (*C. anomala*, *cochranae*, *ocellata*, *ocellifera*), or in combination with dark flecks (*C. peristicta*, *pipilata*, some *prosoblepon*). The only other species having red markings is *C. grandisonae*, a much larger species with small red spots and granular skin on the dorsum.

Description.—Adults small; snout-vent length 20.5–22.5 mm ($\bar{x} = 21.1$, $n = 13$) in males; females not known, head much wider



FIG. 1. *Centrolenella balionota*, KU 164702, ♂, 21.2 mm snout-vent length.

than body; width of head 32.9–34.8 percent ($\bar{x} = 33.8$, $n = 13$) of snout-vent length. Snout short, high, truncate in dorsal and lateral profiles; canthus round; loreal region deeply concave; lips flared; nostrils about five-sixths distance from eye to tip of snout, slightly protuberant laterally; internarial area slightly depressed. Eye large, protuberant, directed anterolaterally. Supratympanic fold covering upper one-fifth of tympanum; tympanic annulus distinct; tympanum strongly directed posterolaterally, inclined dorsally. Prevomerine teeth and dentigerous processes absent; choanae small, triangular, widely separated medially; tongue ovoid, barely free behind, shallowly notched posteriorly; vocal slits extending from posterolateral base of tongue to angles of jaws; vocal sac, single, median, subgular.

Humeral spine, short, blunt, tip not free of skin on upper arm; ulnar folds and tubercles absent; first finger slightly longer than second; fourth finger noticeably shorter than third; lateral fringes on fingers; webbing rudimentary between first and second fingers; webbing formula for other fingers II 2–3 III (2–2½)—2 IV; webbing emarginate; discs round; subarticular tubercles small, round, simple; supernumerary tubercles small, indistinct, present on proximal segments of all fingers; palmar tubercle ovoid, simple; nuptial excrescences absent. Hind limbs moderately slender; length of tibia 54.7–59.0 percent ($\bar{x} = 56.8$, $n = 13$) of snout-vent length; tarsal folds and tubercles absent; inner metatarsal tubercle small, flat, elliptical; outer metatarsal tubercle small, ovoid; subarticular tubercles small, round; supernumerary tubercles absent; feet about three-fourths webbed; webbing formula I 1½–2 II 1½—(1–1½) III (1½–2)—(2½–3) IV (2½–3)—1½ V; discs round, slightly smaller than those on fingers.

Skin on belly and proximal ventral surfaces of thighs weakly granular; skin on other surfaces smooth, elevated on dorsum at sites of white spots. Anal opening directed posteriorly at upper level of thighs; pair of small, flat tubercles below anus.

Color in preservative: dorsum cream with reddish brown flecks on head, body, forearms, thighs, shanks, and feet; reddish brown interorbital marks not widely separated medially; reddish brown postorbital stripe extending posteromedially to postscapular area. Large, elevated white spot on anteromedial edge of each eyelid; white spots on dorsum of body in ten specimens—six with one spot, four with two spots; digits and ventral surfaces creamy white.

Color in life: dorsum pale green with reddish brown stripes and flecks; tips of digits dull yellow; elevated dorsal spots bright yellow; vocal sac bluish green; visceral peritoneum clear; parietal peritoneum white; heart not visible; bones pale green; iris iridescent golden copper.

Distribution.—The type series of *C. balionota* is from a small cascading stream at an elevation of 1540 m on the Pacific slopes of

the Andes; the stream, in disturbed lower montane rainforest, is a tributary of the Río Mindo. The species also is known from La Costa, 800 m, Departamento de Cauca, Colombia; this locality is about 330 km airline north-northeast of the type locality.

Remarks.—All individuals were calling from the upper surfaces of leaves of herbs and ferns overhanging a trickling stream; none was more than 1 m above the water. Other stream-breeding frogs at the type locality include *Centrolenella grandisonae*, *C. griffithsi*, and *Hyla alytolylax*. The call is a single "peep."

Etymology.—The specific name is derived from the Greek *balios* meaning dappled or spotted and the Greek *notos* meaning back; it is used in allusion to the dorsal reddish brown dappling and yellow spots.

Centrolenella heloderma new species

(Fig. 2)

Holotype.—KU 164715, an adult male, from Quebrada Zapadores, 5 km east-southeast of Chiriboga, 2010 m, Provincia de Pichincha, Ecuador (00°17'S, 78°47'W), obtained on 4 April 1975 by William E. Duellman.

Paratopotypes.—KU 164714, 3 April 1979, William E. Duellman; MCZ 97835, 15 March 1979, Kenneth Miyata; USNM 211219–21, 15 March 1979, Roy W. McDiarmid.

Referred specimens.—All Provincia de Pichincha, Ecuador: 14 km W Chiriboga, 1960 m, KU 164716–21; 13.1 km NW Nono, 2140 m, MCZ 97834, USNM 211216–17; 8.6 km SE Tandayapa, 2000 m, USNM 211218; 9 km SE Tandayapa, 2150 m, KU 167422–24.

Diagnosis.—1) prevomerine teeth absent; 2) bones green; 3) parietal peritoneum white; visceral peritoneum clear; 4) color in life dark green with bluish white tubercles; in preservative lavender; 5) webbing between outer fingers III 2½–2 IV; 6) webbing on foot I 1–2 II 1–2 III 1–2 IV 2–1 V; 7) snout rounded in dorsal view, in profile depressed and sloping anterior to nares; 8) dorsal skin tubercular; 9) forearms and feet bearing narrow, scalloped dermal folds; 10) humeral spine present in males; 11) entire tympanum visible, directed laterally with slight posterodorsal inclination.

The tubercular dorsal skin immediately distinguishes *C. heloderma* from other known species of *Centrolenella*, which have either smooth, shagreened, or spiculate skin dorsally. *Centrolenella heloderma* mostly closely resembles *C. buckleyi*, which differs by having fine spinules in the dorsal skin, less webbing on the hand and foot, no dermal folds on limbs, and only the lower part of the tympanum visible. Both species have humeral spines in males, the snout inclined anteriorly, and a narrow white or cream labial stripe.

Description.—Adults moderately large; snout–vent length 26.8–



FIG. 2. *Centrolenella heloderma*, KU 164715, ♂, 29.0 mm snout-vent length.

31.5 mm ($\bar{x} = 29.0$, $n = 17$) in males, 32.3 mm in single female; head slightly wider than body; width of head 33.2–36.8 percent ($\bar{x} = 34.1$, $n = 18$) of snout-vent length. Snout moderately long, depressed, inclined anteriorly from nostrils to margin of lip, rounded in dorsal view; canthus round; loreal region barely concave; lips flared; nostrils about three-fifths distance from eye to tip of snout, barely protuberant laterally; internarial area slightly depressed. Eye moderately small, directed more laterally than anteriorly. Tympanic annulus interrupted by tubercles dorsally, otherwise distinct; tympanum directed laterally with slight posterodorsal inclination. Prevomerine teeth and dentigerous processes absent; choanae small, round, widely separated medially; tongue broadly cordiform, deeply notched posteriorly, free behind for about half of its length; vocal slits extending from midlateral base of tongue to angles of jaws; vocal sac single, median, subgular, large, when inflated extending laterally well beyond sides of head.

Humeral spine long, blunt, projecting anteriorly at angle of about 45° from humerus; forearm robust; low, scalloped dermal fold ventrolaterally on forearm; first and second fingers subequal in length; fourth finger longer than second; lateral fringes on fingers; webbing rudimentary between first and second fingers; webbing formula for other fingers II 2– $3\frac{1}{2}$ III (2– $2\frac{1}{2}$)—($1\frac{1}{2}$ –2) IV; webbing emarginate; discs truncate; subarticular tubercles small, round, simple; supernumerary tubercles absent; palmar tubercle low, indistinct; nuptial excrescences absent. Hind limbs moderately robust; length of tibia 53.0–58.2 percent ($\bar{x} = 55.4$, $n = 18$) of snout-vent

length; row of tubercles on outer edge of tarsus; inner metatarsal fold absent; inner metatarsal tubercle low, elongate; outer metatarsal tubercle small, conical; subarticular tubercles small, round; supernumerary tubercles absent; feet about four-fifths webbed; webbing formula I 1—2 II 1—2 III 1—2 IV 2—(1-1½) V; discs truncate, nearly as large as those on fingers.

Skin on dorsum bearing large, round tubercles; skin on flanks, belly, and proximal posteroventral surfaces of thighs coarsely granular; skin on other surfaces smooth. Anal opening directed posteriorly at upper level of thighs; pair of large round tubercles and many small tubercles below anal opening.

Color in preservative: dorsal surfaces of head, body, forearms, thighs, and shanks dull lavender; other surfaces dull cream; ventral and lateral coloration meeting along a distinct line on upper flanks; anal tubercles and margin of upper lip white.

Color in life: dorsum dark green with bluish white tubercles; margin of lip yellow; parietal peritoneum and throat pale golden yellow; anal, heel, and ulnar tubercles white; heart not visible; bones green; iris pale bronze with fine black reticulations.

Distribution.—*Centrolenella heloderma* is known from several localities near the upper limits of cloud forest (1960–2150 m) on the Pacific slopes of the Cordillera Occidental in Provincia de Pichincha, Ecuador.

Remarks.—Males were calling from upper surfaces of leaves and ferns 1–4 m above streams and on cliff faces below seepages. The call is a harsh “peep.”

A juvenile (KU 164714) having a snout-vent length of 20.9 mm has the dorsal tubercles as well developed as in the adults. A single female (MCZ 97835) having a snout-vent length of 32.3 mm is like the males in structure and coloration.

At all localities where *C. heloderma* was found, *C. griffithsi* occurred in much greater abundance. At higher elevations (>2300 m) on the Pacific slopes, in subpáramo and páramo, *C. heloderma* seemingly is replaced by the widespread Andean species, *C. buckleyi*.

The type locality, Quebrada Zapadores, is a tributary of the Río Saloya and is crossed by a bridge at Kilometer Post 45 on the road from Chillogallo to Santo Domingo de los Colorados via Chiriboga. Although the valley of the Río Saloya is mostly pasture, cloud forest exists in the narrow Quebrada Zapadores containing a stream 2–4 m wide.

Centrolenella prasina new species

Holotype.—KU 169693, an adult male, from Río Calima, 1.5 km (by road) west of Lago Calima, 1230 m, Departamento de Valle,

Colombia ($4^{\circ}00'N$, $76^{\circ}35'W$), obtained on 1 June 1975 by William E. Duellman.

Paratopotypes.—KU 169691–92, 14 September 1974, William E. Duellman and Linda Trueb.

Diagnosis.—1) prevomerine teeth 5–7; 2) bones pale green; 3) parietal peritoneum white; visceral peritoneum clear; 4) color in life uniform bright green; in preservative, uniform lavender; 5) webbing between outer fingers II $2\frac{1}{2}$ – $3\frac{1}{2}$ III $2\frac{1}{4}$ –2 IV; 6) webbing on foot I $1\frac{1}{2}$ –2 II 1–2 III 1– $2\frac{1}{2}$ IV $2\frac{1}{2}$ – $1\frac{1}{2}$ V; 7) snout round in dorsal view, truncate in profile; 8) dorsal skin smooth; 9) arms and legs lacking dermal folds; 10) humeral spines absent in males; 11) tympanum concealed.

The combination of large size (34.5 mm), smooth dorsal skin, uniform green dorsum, and absence of humeral spines in males distinguishes *C. prasina* from all other known *Centrolenella*. The size is approached by *C. megacheira* (32.8 mm), which has small black spots on the dorsum and pustular skin. Other uniform green *Centrolenella* in western South America have humeral spines in males (*C. buckleyi*, *C. heloderma*, some *C. prosoblepon*) or have spiculate dorsal skin (*C. spiculata*).

Description.—Adults large; snout-vent length 33.0–34.5 mm (\bar{x} = 33.7, n = 3) in males; females unknown; head wider than body; width of head 31.6–31.8 percent (\bar{x} = 31.7, n = 3) of snout-vent



FIG. 3. *Centrolenella prasina*, KU 169693, ♂, 33.6 mm snout-vent length.